V.—On a new Trilobite from the *Dictyonema*-shales of the Malvern Hills.

By Professor Theodore T. Groom, M.A., D.Sc., F.G.S.

Acanthopleurella Grindrodi, gen. et sp. nov.

In the collection made by the late Dr. Grindrod, now in the Geological Museum at Oxford, there is a minute species of trilobite, represented by two specimens, obtained from the *Dictyonema*-shales of the Malverns. This form was referred by Dr. Callaway to *Shumardia* (*Conophrys*) *Salopiensis*, Call.;[1] but a careful study of the two specimens, aided by the removal of a small fragment of shale which partly concealed the more complete example, has shown the distinctness of the trilobite from *Shumardia*, and from any other genus known to the writer. Owing to the kindness of Professor Sollas I have been enabled to make a thorough examination of the specimens. The preservation is fairly good, but much of the actual test has been lost, and both fossils are largely in the form of internal casts. In the more complete but somewhat smaller example, which may be taken as the type-specimen, the whole trilobite is preserved (Fig. 3); in the second specimen little more than the thorax and pygidium is seen (Fig. 4). The following description refers to the type-specimen :—

Head smooth, semi-elliptical; frontal and lateral margins descending somewhat suddenly; genal angles acute. Glabella fairly convex, smooth, broad in front, reaching the margin (which here projects slightly beyond the cheeks), rather more than one-third of which it occupies; narrowing rapidly behind to the neck-furrow, behind which it expands again to form a well-pronounced and rather broad neck-lobe; separated from the smooth cheek by a deep and fairly broad axal furrow with a rounded floor; neck-furrow not strongly marked on the glabella, but well-pronounced on the free cheeks, to the posterior margin of which it is parallel; on the inner side it unites with the axal furrow, and on the outer extends nearly to the genal angle, and much resembles one of the pleural furrows; cheeks in front of the neck-furrow rising up steeply to their greatest height; no traces visible of other furrows on the glabella, or of eyes, or facial sutures on the cheeks. Length of head, 0·41 millimeter; breadth, 1·12 millimeter.

Thorax slightly narrower than the head, and longer than either head or pygidium; consisting of four segments. Axis very convex (Fig. 2), occupying some two-fifths of the width of the thorax in front, and gradually diminishing in breadth behind; inflated in each segment, the inflated portions being separated by rounded depressions, and extending to the pleuræ in the form of ridges directed obliquely forwards, one on each side. Pleuræ straight for most of their length, depressed near the axis (Fig. 2), especially in the first rings of the thorax, the depression gradually

[1] Quart. Journ. Geol. Soc., 1877, vol. xxxiii, p. 660.

dying out behind; each pleura facetted in front, and marked by fairly deep, straight grooves for the whole of their length, the grooves being margined in front by a well-defined ridge; at their ends the pleuræ suddenly bend sharply backwards and a little downwards, and end in spines; traces only of the first three pairs of spines are seen, but those of the fourth segment are long and extend for some distance behind the end of the pygidium. Length of the thorax, 0·54 millimeter; breadth, 1·08 millimeter.

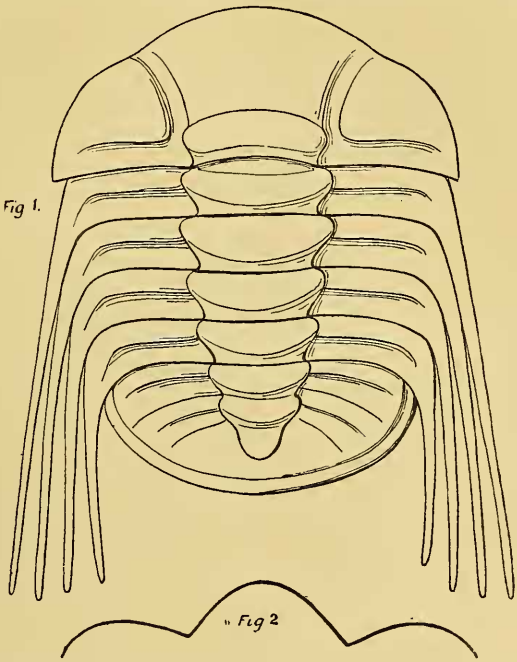


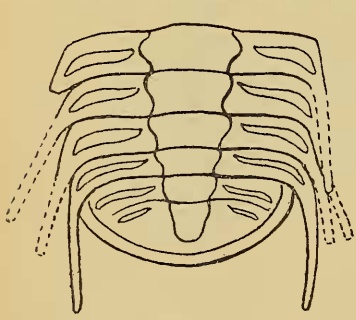
Fig. 1.—*Acanthopleurella Grindrodi*, gen. et sp. nov., restored with the aid of the specimens shown in Figs. 3 and 4. The spines at the ends of the pleuræ of the first three rings of the thorax require very careful illumination to render them visible.

Fig. 2.—Optical section of the tergum of the thorax of the specimen shown in Fig. 3.

Pygidium semi-elliptical; axis convex, conical, terminating at a short distance in front of the hind margin, and showing only one well-marked transverse constriction. Limbs tolerably flat, with several ridges and grooves corresponding to those of the thoracic pleuræ, and extending as far as the raised marginal rims. Margin probably entire. Anterior angles apparently rounded. Length of pygidium, about 0·4 millimeter; breadth, 0·83 millimeter.

The specimen is partly enrolled; this fact, together with its convexity, has made it impossible to obtain good photographs of the whole trilobite. The total length when unrolled would be 1·4 millimeter, or two-thirds of a line.

The second specimen (Fig. 4) belongs to an individual somewhat larger than the first. The length and breadth of the thorax are 0·62 and 1·1 millimeter respectively, and those of the pygidium 0·35 and 0·85 millimeter. The specimen, moreover, is less convex, perhaps partly owing to pressure, and the axis of the thorax is broader; in front it occupies nearly one-half of the total breadth of the thorax, and behind about one-third of the breadth at that point. The ridges connecting the axes with the pleuræ are, moreover, broader. Apart from these differences in proportion the two specimens agree, but the details of the thorax and pygidium are better shown in the second specimen. The spines of the first three thoracic rings are more perfectly shown, and those, at any rate, of the second and third extend backwards for a considerable distance. The pygidium shows more definite indications of a composition out of two segments in front, and an obscurely segmented or unsegmented portion behind; the rather narrow raised margin of the limbs is very distinct, and is entire. The anterior angles appear to be rounded. Of the head little more than a part of the neck-segment is preserved.



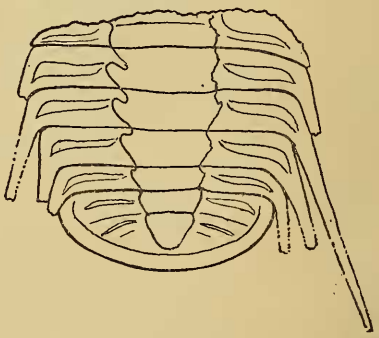


Fig. 3. Fig. 4.

Fig. 3.—Head, thorax, and pygidium of *Acanthopleurella Grindrodi*, gen. et sp. nov., × 37, as made out with the aid of photographs and drawings. The specimen being partly enrolled, all three parts have been drawn separately.

Fig. 4.—Thorax, pygidium, and a portion of the head of *Acanthopleurella Grindrodi*, gen. et sp. nov. × 31. The outlines of this figure were traced from a photograph, with the exception of the portions defined by dotted lines, which have been made from freehand and camera lucida sketches.

Both specimens were obtained from the grey shales of the Southern Malverns, in which also *Cheirurus Frederici*, Salter, *Agnostus dux*, Call., and certain imperfect Asaphids and Olenids have been found. These probably include *Platypeltis Croftii*, Call., *Asaphellus affinis*, McCoy, *Niobe Homfrayi*, Salter, *Niobe*, sp., and *Parabolinella*? *triarthrus*, Call.

The affinities of this little trilobite are obscure. The diminutive size, the small number of segments, and the apparent absence of

eyes and facial sutures suggest that it may be a larval form. On the other hand, these features are also shown by such minute trilobites as *Agnostus*, *Microdiscus*, and *Shumardia*; and the lack of resemblance to any of the larger trilobites of the Tremadoc fauna, together with the circumstances that both specimens are minute, and that the larger of the two shows no advance in organization, tells in favour of the view that we are dealing with an adult form. For this form I would suggest the name of *Acanthopleurella Grindrodi*. The conformation of the head suggests Trinucleoid affinities, but there is no marginal rim, and the rest of the body appears to show Olenid characters. *Shumardia* is possibly an ally, but from this form *Acanthopleurella* differs in the extension of the glabella to the front margin of the head, in the absence of all glabella-furrows with the exception of the neck-furrow, and in the spinous prolongations of the thoracic pleuræ, and in other respects.

NOTICES OF MEMOIRS.

I.—On a Primitive Type of Structure in Calamites. By D. H. Scott, M.A., Ph.D., F.R.S.[1]

PALÆONTOLOGICAL research has afforded evidence that the Horsetails and Lycopods, groups now so distinct, had a common origin. The class Sphenophyllales, restricted, so far as we know, to the Palæozoic epoch, combines in an unmistakable manner the characters of Equisetales and Lycopodiales, while at the same time presenting peculiar features of its own. Broadly speaking, it is in the external morphology and in the reproductive structures that the Equisetales are approached, while the anatomy has an evidently Lycopodiaceous character.

The synthetic nature of the Sphenophyllales, indicated clearly enough in the type-genus *Sphenophyllum* itself, comes out still more obviously in the new genus *Cheirostrobus*. Here the general morphology of the strobilus, the form and structure of the sporangiophores and of the sporangia themselves, are all of a Calamarian type, while the anatomy of the axis is as clearly Lycopodiaceous in character.

So far nothing has been found to bridge the gulf which separates the anatomy of the Calamarieæ (Palæozoic Equisetales) from that of the Sphenophyllales or the Lycopods. The most ancient known genus of Calamarieæ—*Archæocalamites*—approaches the Sphenophyllales in the superposition of the foliar whorls and in the dichotomous subdivision of the leaves, points on which Professor Potonié, especially, has laid stress. Anatomically, however, according to the researches of Dr. Renault and Count Solms-Laubach, it was an ordinary Calamite, differing in no essential respect from those of the Coal-measures. The stem of *Archæocalamites*, like that of its later allies, had a large pith, surrounded by a ring of collateral vascular bundles, the wood of which, primary as well as secondary,

[1] Read before the British Association, Section C (Geology), Glasgow, Sept., 1901.